

**REMARKS**

The Examiner is thanked for the due consideration given the application.

Upon entry of this amendment, claims 1, 3-11, 14-21 and 25-28 are pending in the application. Claims 12 and 13 are canceled by this amendment. Independent claims 1, 26 and 28 have been amended to clarify the structure and stoichiometric relationships.

No new matter is believed to be added to the application by this amendment.

Entry of this amendment under 37 CFR §1.116 is respectfully requested because it cancels claims and places the application in condition for allowance.

**Objection to the Disclosure**

The disclosure is objected to as containing informalities. The Official Action asserts that the specification at page 8, lines 12-13 teach that  $x+y+z=1$  in one embodiment and that the specification also teaches that  $z+y+z$  need not be equal to 1.

However, this embodiment of the present invention is part of a set of conditions pertaining to stoichiometry, morphology and phase structure. It is thus clear that a relationship of  $x$ ,  $y$  and  $z$  (such as  $x+y+z=1$ ) is meant that satisfies these conditions.

Also, it is well known to one of skill in the art that complex crystallographic relationships, such as in the present invention, can be stoichiometric or non-stoichiometric either overall or at different sites.

It is thus believed that the disclosure is free from informalities.

**Claim Objections**

Claims 21 and 27 have been objected to as failing to further limit the subject matter of a previous claim.

The Official Action asserts that claim 21, for example, sets forth a morphotropic tetragonal rhomboidal phase boundary, but this structure would be inherent in base claim 1.

However, from the phase diagram of PZT, is clear that not every PZT inherently has a morphotropic tetragonal rhomboidal phase boundary. This is evidenced by the diagrams (reproduced below) set forth in Chapter 7 of Jaffe (Piezoelectric Ceramics), which was submitted with the Amendment filed July 14, 2008.

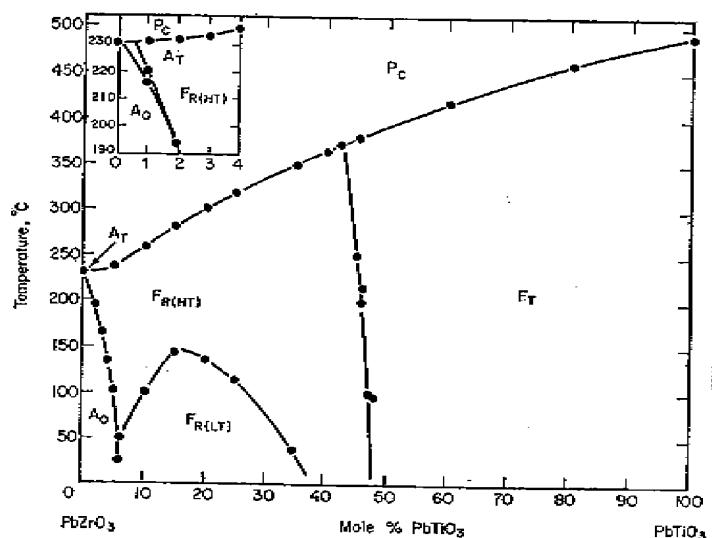


FIG. 7.1.  $\text{PbTiO}_3$ - $\text{PbZrO}_3$  sub-solidus phase diagram.

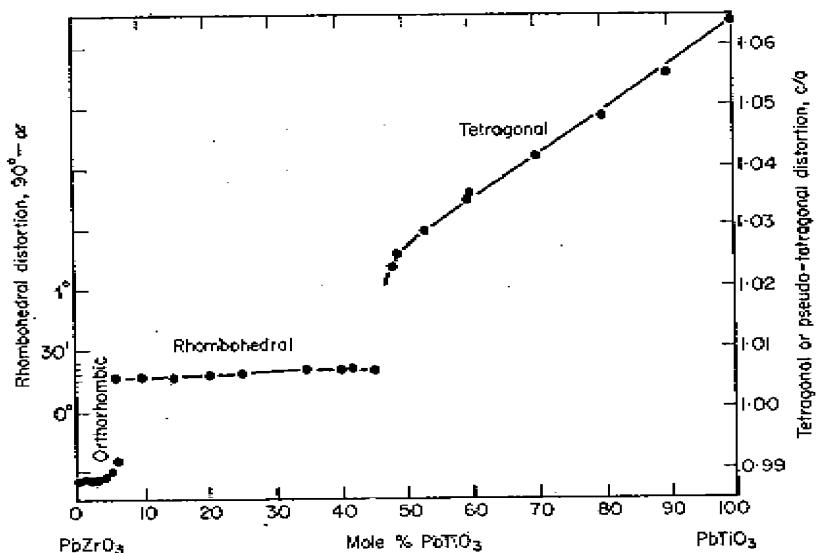


FIG. 7.2. Unit cell distortion at room temperature for the  $\text{PbTiO}_3$ - $\text{PbZrO}_3$  system.

As can be seen from the phase diagram of PZT, not every PZT has a morphotropic rhombohedral phase boundary.

Therefore, the assertion in the Official Action that this structure would necessarily be inherent is not true, based upon the observations set forth above.

Accordingly, claims 21 and 27 clearly further limit their respective base claims.

**Rejection Under 35 USC §112, First Paragraph**

Claims 12 and 13 have been rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed.

Claims 12 and 13 have been canceled by this amendment without prejudice or disclaimer to thereby render this rejection moot.

Withdrawal of this rejection is accordingly respectfully requested.

**Rejection Under 35 USC §112, Second Paragraph**

Claims 1, 3-6, 10-21 and 25-28 have been rejected under 35 USC §112, second paragraph, as being indefinite. This rejection is respectfully traversed.

The Official Action asserts that the variables a, x, y and z are not defined in claims 1, 26 and 28. Instant claims 1, 26 and 28 clearly set forth these variables, stating: "*where a is selected from a range of 0.2 mol% to 3 mol%, x and y are each greater than 0, b is a rare earth metal proportion and z is a transition metal proportion.*" Further it is noted that x, y and z

can be defined as  $x+y+z=1$ , such as is set forth in claims 25, 26 and 28.

Also, the independent claims have been amended to better define the stoichiometric relationships of the present invention, stating: *"an A site of a perovskite has one stoichiometry such that it is unnecessary that a B site of the perovskite is non-stoichiometric."*

The claims are thus clear, definite and have full antecedent basis.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Conclusion

The objections and rejections are believed to have been overcome, obviated or rendered moot, and that no issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON

/Robert E. Goozner/

Robert E. Goozner, Reg. No. 42,593  
209 Madison Street  
Suite 500  
Alexandria, VA 22314  
Telephone (703) 521-2297  
Telefax (703) 685-0573  
(703) 979-4709

REG/jr